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## *ATYPHLOCERAS TANCITARI* AND *JELLISONIA BONIA*, NEW SPECIES OF FLEAS FROM MEXICO (SIPHONAPTERA)<sup>1</sup>

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The fleas of indigenous Mexican mammals are of potential medical significance and are relatively poorly known. Thus, although the genus *Jellisonia* was established as recently as 1944 (Traub, 1944), six species have already been described. All are parasites of mice such as *Peromyscus*, *Baiomys*, *Microtus*, and *Reithrodontomys*. Each of the known species occurs in Mexico, and at least two have been found in the United States (Traub, 1950; Eads, 1951). *Atyphloceras* is also a parasite of various mice. Six species have been described in the United States, but further study may prove two or three of these to be synonyms. The present paper includes a description of a new species of *Atyphloceras*, the first record of the genus in Mexico, and a description of a new species of *Jellisonia*.

### ABBREVIATIONS USED IN TEXT AND FIGURES

A.B., antepygidial bristle  
AE.A., aedeagal apodeme  
A.I.T., armature of inner tube  
A.L.L., accessory lateral lobe  
A.M.S., apicomedian sclerite of aedeagus  
A.S., anal stylet  
B.C., bursa copulatrix

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- B.I.T., narrow band of inner tube extending distad of apex of sclerotized inner tube  
CR., crochet  
C.S., crescent sclerite of aedeagus  
D.A.L., dorsal anal lobe of proctiger  
D.A.9, distal arm of ninth sternum  
D.S., dorsal lobe of apodemal strut of aedeagus  
F., digitoid or movable finger  
I.R., ventral intramural rod of endophallus  
LD., lucodiscs  
L.L., lateral lobes of aedeagus  
L.M., lateral metanotal area  
L.S., lateral ventral lobe of apodemal strut  
L.S.I., lateral sclerotization of inner tube  
MB., manubrium  
M.D.L., median dorsal lobe of aedeagus  
MPM., mesepimere  
MPS., mesepisternum  
M.S., submedian mesal lobe of apodemal strut of aedeagus  
MSN., mesonotum  
MTM., metepimere  
MTN., metanotum  
MTS., metepisternum  
P., immovable process of clasper  
P.A.9, proximal arm of ninth sternum  
PL.A., pleural arch of metathorax  
P.R., penis rods  
P.S., proximal spur  
PS.S., pseudosetae  
P.W., wall of aedeagal pouch  
7S., seventh sternum  
8S., eighth sternum  
9S., ninth sternum  
S.I.T., sclerotized inner tube  
SP., spermatheca  
SQ., squamulum  
1T., first tergum  
8T., eighth tergum  
T.AP.9, apodeme of ninth tergum  
V.A.L., ventral anal lobe

FAMILY HYSTRICHOPSYLLIDAE

SUBFAMILY HYSTRICHOPSYLLINAE

***Atyphloceras tancitari*, new species**

Figures 1-4, 6, 7, 10-13

TYPES

Holotype, male, collected by senior author *ex nest* of *Reithrodontomys c. chrysopsis* Merriam; Mexico, Michoacan, Mt. Tanci-

taro, elevation 7800 feet; July 8, 1941. Allotype, female, *ibid.*, but *ex Peromyscus hylocetes* Merriam, July 5, 1941. Five paratype females with data as follows: *ibid.*, but *ex Peromyscus hylocetes* Merriam, July 5, 1941; *ibid.*, but *ex* nest of *Reithrodontomys c. chrysopsis*, July 15, 1941; *ibid.*, but *ex Microtus mexicanus phaeus* Merriam, July 12, 1941; *ibid.*, but *ex Peromyscus melanotis* Allen and Chapman, elevation 10,000 feet, July 26, 1941; *ibid.*, but *ex Peromyscus melanotis*, elevation 10,500 feet, July 19, 1941. Holotype and allotype deposited in the collection of the Chicago Natural History Museum. Paratypes deposited in the United States National Museum and in the collection of the senior author.

#### DIAGNOSIS

The male of *Atyphloceras tancitari*, new species, can be separated from *Atyphloceras echis* Jordan and Rothschild, 1915, by the shape of the distal arm of sternum nine, which is cleaver shaped (D.A.9, figs. 3, 6), not half-moon shaped (fig. 9), and by the shape of the posterior margin of the immovable process of the clasper (P., figs. 3, 7), which is straight, not with caudad-directed hump at level of acetabulum. Distinct from *Atyphloceras multidentatus* (C. Fox, 1909) in that process (P., figs. 3, 7) with subrounded apex and posterior margin without hump at level of acetabulum; mesal surface with 13 or fewer small scattered hairs; not with pointed apex and definite hump on posterior margin at level of acetabulum (fig. 5, P.) and with 15 or more mesal bristles, most confined to median portion. Metepimere (fig. 2, MTM.) with two rows of bristles, not three rows (at times third row represented by one anterior bristle). Posterodorsal border of eighth sternum evenly convex (fig. 3, 8S.), not bilobed (fig. 8). Female can be separated from *A. echis* and *A. multidentatus* in that *A. tancitari*, new species, has 10 to 12 small bristles over or above the spiracle on tergum eight (two females have nine on one side, 10 on the other); not four to nine bristles (average seven).

#### DESCRIPTION

HEAD, MALE (FIG. 1): Frontoclypeal margin somewhat flattened; ventral to frontal tubercle, margin vertical and straight. Micropunctations on pre-antennal and postantennal areas above rows of bristles. Pre-antennal area with three rows of bristles, dorsal of eight (six to seven in female), middle of four or five (four to six in female), ventral of three or four (four or five in

female), those of ventralmost row longest. Eye reduced, not heavily pigmented. Maxillary lobe extending to middle of third segment of maxillary palpus. Labial palpus with seven or eight segments (this character probably variable), extending slightly beyond apex of fore coxa. Genal lobe well developed, with three large lucodiscs (LD.). First antennal segment with a few small basal bristles and subapical row of three or four slightly longer bristles; second antennal segment with apical row of very short bristles, not reaching apex of second segment of club. Postantennal area with four rows of bristles arranged approximately 7-7-6-8, plus several small bristles along posterior margin of antennal groove.

THORAX (FIGS. 1 AND 2): Pronotum with comb of about 10 spines on a side; with two rows of bristles, those of posterior longest and with intercalaries. Mesonotum (MSN.) with about five rows of bristles, first four rows of short bristles, last of long bristles with intercalaries. Pseudosetae not visible on male (female with one or two very faint pseudosetae). Mesepisternum (MPS.) with four or five short bristles. Mesepimere (MPM.) with about eight bristles, those of first row short. Metanotum (MTN.) with four rows of bristles, first row incomplete, bristles of last row longest and with intercalaries. Lateral metanotal area (L.M.) well developed, with two bristles, shorter bristle dorsal (variable in female). Pleural arch (PL.A) well defined. Metepisternum (MTS.) with two bristles near posterodorsal angle. Squamulum (SQ.) well developed. Metepimere (MTM.) with two rows of bristles arranged 3(5)-4(3) (female with three rows).

LEGS: Procoxa with many lateral bristles, mesocoxae and metacoxa with bristles confined to anteroventral aspect. Metacoxa with small thin submarginal mesal bristles from about midpoint to apex. Metatibia with dorsolateral notches containing long bristles as follows (excluding apical 3): 2-2-2-2-1-2. Measurements of tibia and tarsal segments of holotype (excluding petiole base) are as follows (shown in microns):

LEG	TIBIA	TARSAL SEGMENTS				
		I	II	III	IV	V
Pro-	244	82	82	62	52	113
Meso-	371	175	117	93	52	113
Meta-	515	299	206	117	82	237

Fifth segment of each tarsus with five lateral plantar bristles.

ABDOMEN: First tergum (fig. 2, 1T.) with three rows of bristles,



last row longer and with intercalaries. Most abdominal terga with two rows of bristles, posterior row with intercalaries. Apical spinelets on terga one through six (on both sides) as follows: 6-12-11-9-9-2 in holotype; females 5(to 6)-7(to 11)-6(to 9)-5(to 7)-2(to 4)-2. Basal abdominal sternum with one very small ventromarginal bristle, female at times with one small lateral bristle in addition to ventromarginal bristle. Typical abdominal sterna with two very short rows of bristles, plus one or two anterior submarginal bristles. Both sexes with three antepygidial bristles (figs. 3, 10, A. B.), middle longest, upper one-half length of middle, lower slightly longer (one anomalous female with only two bristles on one side).

MODIFIED ABDOMINAL SEGMENTS, MALE (FIG. 3): Eighth tergum (8T.) reduced, extending ventrally to level of acetabulum. Eighth sternum (8S.) smoothly concave from anterodorsal angle to postero-dorsal lobe, which has six or seven marginal bristles, one bristle proximal to these at level of lowest marginal bristle, preceded by three short rows of lateral bristles and some additional marginal bristles. Immovable process of clasper (P.; see also fig. 7) with rather broad subrounded apex bearing four long apical bristles, three or four shorter subapical bristles, on one side an anomalous bristle in position suggesting acetabular bristle, and about 10 small scattered mesal bristles apically, and patch of about six at base of manubrium; posterior margin fairly straight; manubrium (MB.) subacuminate; tergal apodeme of segment nine (T.AP.9) narrow. Movable finger or digitoid (F.; see also fig. 7) five times as long as broad, with narrowed apex bearing several short bristles, five long bristles on slightly convex posterior margin, three or four anteriorly directed bristles on anteroventral margin and several small lateral and mesal bristles. Proximal arm of ninth sternum (P.A.9) with truncate apex bearing an acuminate apical projection; small rounded ventromarginal projection proximal to apex. Distal arm of ninth sternum (D.A.9; see also fig. 6) with semi-membranous cleaver-shaped apex bearing six apical bristles, two or three subapical bristles, two anteromarginal (dorsal) bristles, and a patch of six small bristles, some mesal, near posteroventral angle.

AEDEAGUS (FIGS. 3 AND 4): Aedeagal apodeme (AE.A.) very broad, a little more than twice as long as broad. Aedeagus proper about one and one-third times as long as broad. Proximal spur (P.S.) well developed. Accessory lateral lobe (A.L.L.) long and

narrow, apically acuminate. Median dorsal lobe (M.D.L.) with sclerotized dorsal margin ending apically in small acuminate lobe, followed ventrally by bell-shaped apicomedian sclerite (A.M.S.) which has more heavily sclerotized basal band lying over end of sclerotized inner tube (S.I.T.). Crochets (CR.) weakly sclerotized, three times as long as broad, apparently joined to aedeagal pouch wall (P.W.) along longitudinal margin; with acuminate ventral angle. Sclerotized inner tube (S.I.T.) short, not parallel to dorsal margin of M.D.L.; armature of inner tube (A.I.T.) as long as the tube and lying dorsally over it, with apicolateral arms lying across tube. Lateral sclerite of inner tube (L.S.I.) apparent as hooked acuminate process basal to tube. Crescent sclerite (C.S.) long, narrow, and poorly sclerotized. Dorsal sclerite (D.S.) of apodemal strut with thickened dorsal border; median sclerite (M.S.) long, with acuminate distal arm pointing dorsally; lateral sclerite (L.S.) apically blunt, narrow, with ventrobasal spur. Intramural rod (I.R.) extending from distal level of apodemal strut anteriorly one-half length of aedeagal apodeme. Penis rods (P.R.) not extending past apex of aedeagal apodeme.

Dorsal anal lobe of proctiger (D.A.L.) with several apical and subapical bristles. Ventral anal lobe of proctiger (V.A.L.) as above.

MODIFIED ABDOMINAL SEGMENTS, FEMALE (FIG. 10): Seventh sternum (7S.) with square or subrounded ventral lobe, three or four rows of bristles arranged approximately 6-7-3-3, most posterior row of stouter bristles. Eighth tergum (8T.) large, extending ventrally to ventral margin of eighth sternum (8S.), with rounded posterior margin; a patch of 10 to 12 small bristles above spiracle; short double row of bristles directly below spiracle, arranged 4-5;3, one bristle of posterior row quite long; lateromedian area without bristles; ventrally with patch of about 13 medium-sized bristles and one long bristle; submarginally with three or four rather long bristles and seven or eight small mesal bristles. Eighth sternum (8S.) rounded apically and bearing five or six very small bristles. Ninth sternum (9S.) without bristles. Dorsal anal lobe (D.A.L.) with row of marginal bristles, apical ones longer; several lateral bristles. Anal stylet (A.S.; see also fig. 12) three times as long as wide, bearing an apical long bristle, a very small subapical dorsal bristle, and a similar ventral bristle. Ventral anal lobe (V.A.L.; see also fig. 13) with two or three long

apical bristles and a patch of long ventrobasal bristles. Spermathecae (SP.; see also fig. 11) subequal, with oval head; tail slightly expanded distally; tail at widest point about one-half width of head. Bursa copulatrix (B.C.) ellipsoidal, margins more heavily sclerotized; at times folded in midline so that points are in juxtaposition, or canoe-shaped with lateral margins up-curved.

#### FAMILY CERATOPHYLLIDAE

#### SUBFAMILY CERATOPHYLLINAE

#### *Jellisonia bonia*, new species

Figures 14-21, 23

#### TYPES

Holotype, male (R.T. No. B-8320, G.W.W. No. 122); *ex Peromyscus*; Mexico, Vera Cruz, Texolo; collected by G. W. Wharton; October 18, 1950; deposited in the collections of the American Museum of Natural History. Paratype male with same data and two additional paratype males *ex Peromyscus*, Mexico, Vera Cruz, 7 miles east of Jalapa, collected by G. W. Wharton, October 12, 1950; deposited in collections of the United States National Museum, Chicago Natural History Museum, and of the senior author. Female unknown.

#### DIAGNOSIS

Near *Jellisonia wisemani* Eads, 1951, but separated as follows: Digitoid or movable finger (fig. 21, F.) with caudomarginal subspini-forms near midpoint, above level of insertion of acetabular bristle; not with subspini-forms on ventral half of caudal margin, below insertion of acetabular bristle (fig. 22, F.). Digitoid with caudal margin evenly convex from base to apex; not with proximal half of this margin subtruncate, turning sharply cephalad below insertion of spini-forms. Crochet (fig. 23, CR.) with apex subacuminate, its dorsal hump bearing a well-defined spiculose or micromucronate area, instead of crochet (fig. 24) with subrounded apex and lacking a conspicuous spiculose hump. Lateral sclerotization of inner tube (fig. 23, L.S.I.) broader, its maximum breadth about three-fourths of its depth below dorsal sinus, not less than half this depth (fig. 24, L.S.I.).

## DESCRIPTION

HEAD, MALE (FIG. 15): Frontoclypeal margin evenly rounded except for distinct acute tubercle near midpoint; micropunctations scattered above and in front of first row of bristles on both pre-antennal and postantennal regions. Pre-antennal area with three rows of bristles arranged 6(to 9)-4-3. Uppermost bristle of last row inserted just anterior to eye. With eye distinct, well sclerotized, subovate. Genal processes broad, somewhat rounded apically. Maxillary lobe extending slightly beyond apex of third segment of maxillary palpus. Labial palpus five-segmented, extending about five-sixths length of fore coxa. First antennal segment about twice as long as broad; with marginal row of small bristles and a few dorsomarginal ones. Second antennal segment with a fringe of short bristles which are no longer than this segment. A row of small hairs bordering dorsal margin of antennal fossa. Postantennal region with three rows of bristles, arranged approximately 4-5-6; with intercalary bristles between bases of last row.

THORAX (FIGS. 14 AND 15): Pronotum with one row of bristles, ventralmost bristle longest, the row with intercalary hairs; with comb of about eight or nine well-developed spines on a side. Mesonotum (fig. 14, MSN.) with three rows of bristles; the first row very much reduced, those of last row longest and with small intercalaries; flange of mesonotum with two dorsal and one ventral pseudosetae (PS.S.) per side. Mesepisternum (MPS.) usually with three or four medium-sized bristles. Mesepimere (MPM.) with six bristles, arranged 3-3. Metanotum (MTN.) with two rows of bristles, those of second row longest and with intercalaries. Metanotal flange lacking apical spinelets; lateral metanotal area (L.M.) distinct; with two bristles; caudal margin lateral to and extending over much of the well-developed pleural arch (PL.A.). Metepisternum (MTS.) with a long subdorsal bristle. Squamulum (SQ.) well developed. Metepimere (MTM.) usually with six bristles arranged 2-3-1; spiracle subovate.

LEGS: Procoxa with many lateral bristles scattered over entire length of segment. Mesocoxae and metacoxae with few such bristles and those submarginal or subapical. Profemur with about nine thin small scattered lateral bristles and one ventromarginal subapical bristle. Mesofemora and metafemora lacking the scattered lateral bristles and with two to three small mesal bristles. Tibial comb reduced, as compared with genotype; metatibia (fig. 18) with large dorsomarginal notches bearing large bristles



as follows (from base to apex): 1-2-1-2-2-1-2 (excluding apical 3). Measurements of tibiae and segments of tarsi (petiolate base deleted) shown in microns:

LEG	TIBIA	TARSAL SEGMENTS				
		I	II	III	IV	V
Pro-	135	55	60	45	35	85
Meso-	250	120	105	70	45	90
Meta-	325	255	175	105	55	100

Protibiae and mesotibiae with one apical bristle which reaches well beyond apex of first tarsal segment. None of tarsal segments with an apical bristle extending beyond apex of succeeding segment. Fifth tarsal segment in each case with proximal pair of plantar bristles slightly displaced medially and with four pairs of lateral plantar bristles. Blade of unguis about twice length of thickened recurved basal portion.

ABDOMEN: First tergum (fig. 14, 1T.) with two rows of bristles, those of last row longest and with intercalaries; flange with one apical spinelet per side. Terga two through five with tergal teeth arranged as follows (total numbers): 4-4(2)-2-2(0); with second row of bristles extending slightly ventrad to subovate spiracle. Basal sternum with one ventromarginal bristle. Unmodified sterna with a row of two bristles. With one well-developed antepygidial bristle and two vestigial ones.

MODIFIED ABDOMINAL SEGMENTS, MALE (FIG. 16): Eighth tergum (8T.; see also fig. 17) very well developed, covering most of genitalia; with about five small thin bristles above spiracle and seven subdorsal bristles, including marginals; with one long ventral bristle. Eighth sternum reduced, not apparent except for mesal sclerotization arising near base of bristles of seventh sternum. Intersegmental membrane between eighth and ninth segments very poorly developed. Immobile process of clasper (P.; see also fig. 21) somewhat narrowed towards apex, distally rounded, with three small apical bristles; caudal margin convex but somewhat sinuate near midpoint and adjacent to acetabular bristles. Digitoid or movable finger (F.; see also fig. 21) extending slightly distad of P.; anterior margin slightly convex near midpoint; apex very slightly pointed. Caudal margin fairly evenly rounded except for short stem at base; with three mesal stout bristles or subspiniforms near midpoint, two of these marginal and one submarginal; with two stout marginal bristles above these subspiniforms; with three small bristles near apex.

Tergal apodeme of ninth segment (T.AP.9) slightly longer than manubrium (MB.), which is somewhat dilated subapically. Ninth sternum with proximal arm (P.A.9) about as long as distal arm (D.A.9); broadened subapically and here arched like a crooked finger. Distal arm (D.A.9; see also fig. 19) with a somewhat expanded apical portion; enlargement due to weakly sclerotized anterior (dorsal) margin; with two subapical cephalad-directed bristles, ventralmost of which represents the stout bristle characteristic of genus; with two stout marginal bristles near midpoint of caudal margin; usually with one long thin bristle below these and three or four below them; with scattered thin non-marginal bristles from midpoint to apex; with two short stout apical bristles, almost resembling spiniforms; above these two thin apicomarginal bristles.

AEDEAGUS (FIGS. 16 AND 23): Aedeagal apodeme (AE.A.) less than twice length of aedeagus proper. Proximal spur (P.S.) well developed. Lateral plates of aedeagal apodeme dorso-apically produced into acuminate projections (A.L.L.) overlapping portion of end chamber. Median dorsal lobe (M.D.L.) weakly sclerotized, somewhat sinuate. Lateral lobes (L.L.) well developed, enclosing most of end chamber and extending from its base to near dorsal margin of M.D.L. Crochet (CR.) very well developed, much longer than end chamber proper; apically beak shaped, dorsally with a projection or hump which is rugose or micromucronate; dorsal margin proximad of hump slightly concave. Crochet nearly four times as long as broad at midpoint. Sclerotized inner tube (S.I.T.) oblique, its apex with an upturned acuminate projection. Sclerotized band of inner tube (B.I.T.) well developed. Lateral sclerotization of inner tube (L.S.I.) shaped like a broad but apically acuminate chela. Armature of inner tube (A.I.T.) represented by a sclerite shaped like an Indian club and lying on each side of inner tube near its apex; axis of Indian club almost at right angles to that of S.I.T. Distad of inner tube on each side with an irregularly shaped apicomedian sclerite (A.M.S.); dorsal and anterior portion of this sclerite more sclerotized than remainder of structure. Lateral ventral sclerite (L.S.) of apodemal strut quite broad. Crescent sclerite (C.S.) conspicuous. Penis rods (P.R.) not coiled. Ventral intramural rod (I.R.) well developed.

Tenth abdominal segment conspicuous; sensillum fairly flat; dorsal anal lobe (D.A.L.) with a dorsomarginal row of bristles and a few lateromedian bristles, longest bristles apical; ventral anal

lobe more than three times as long as broad; with long apical bristles; proximoventral sclerite represented by a subtriangular dark area.

#### REMARKS

*Atyphloceras tancitari* was collected during the Fourth Hoogstraal Expedition to Mexico. *Jellisonia bonia* was collected by Dr. George Wharton during an ectoparasite survey of Mexican rodents, supported in part by a grant from the Guggenheim Foundation.

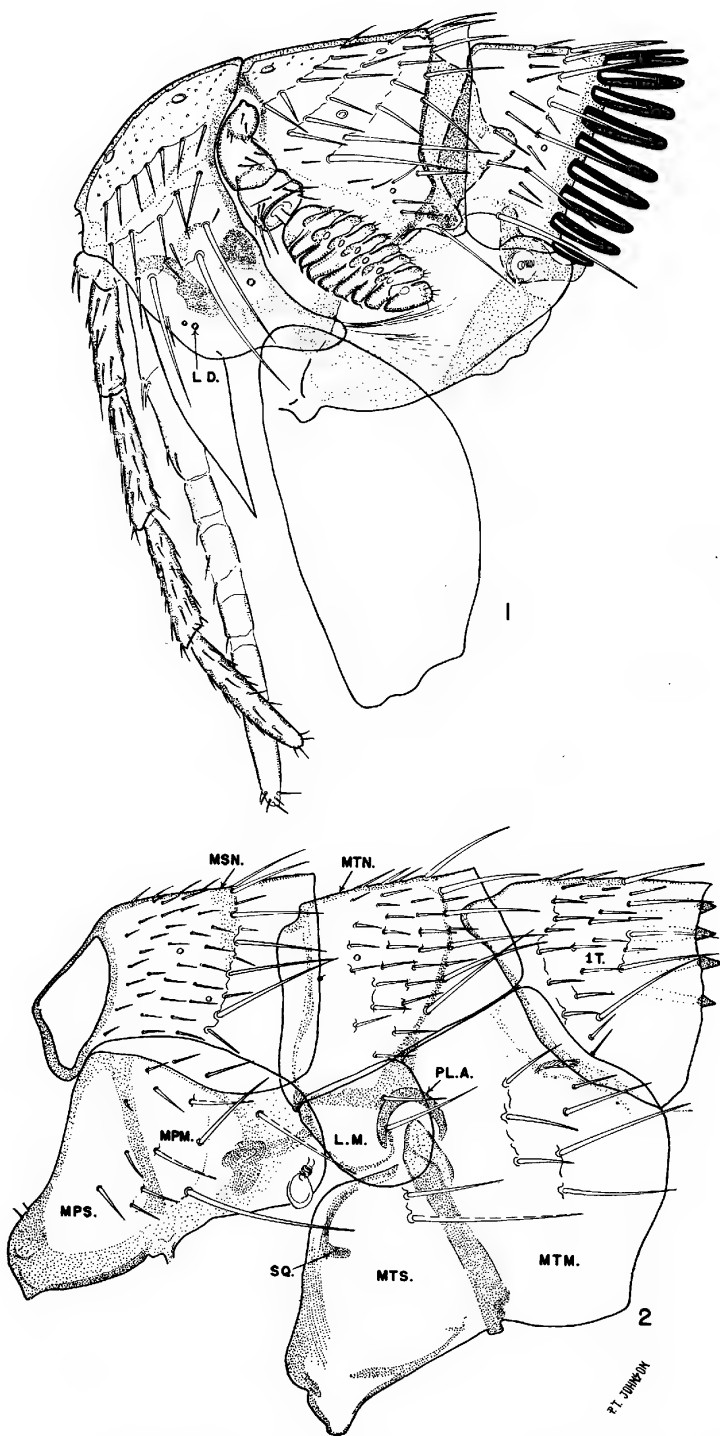
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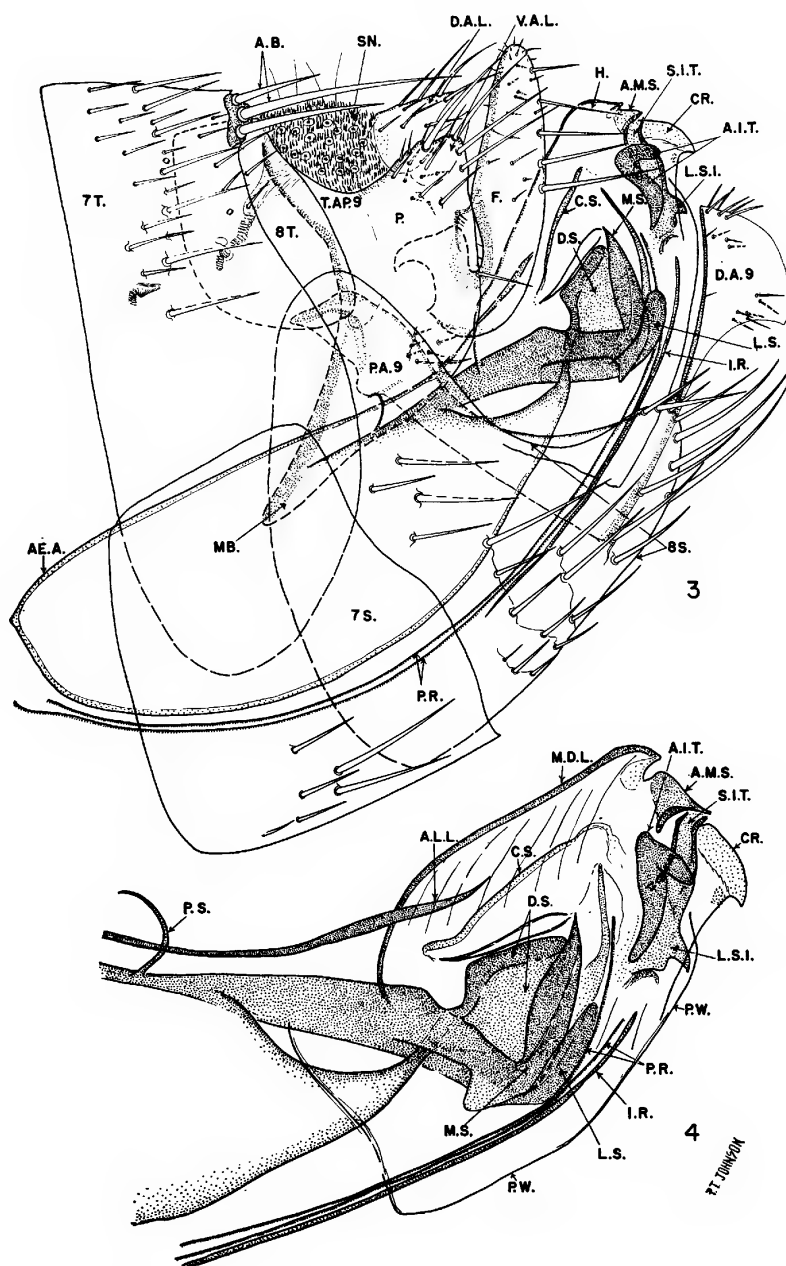
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FIGS. 1, 2. *Atyphloceras tancitari*, new species. 1. Head, male. 2. Thorax, male.





FIGS. 3, 4. *Atyphloceras tancitari*, new species. 3. Modified abdominal segments, male. 4. Aedeagus.

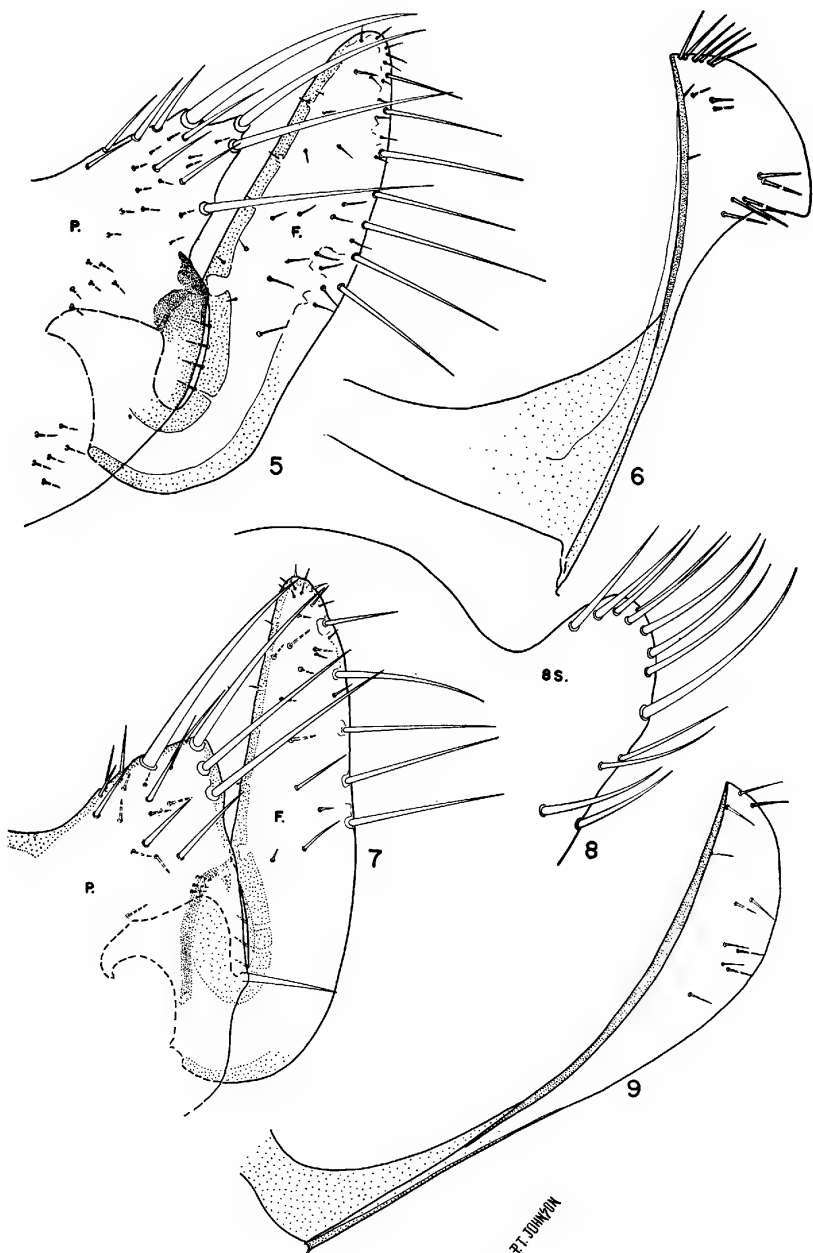
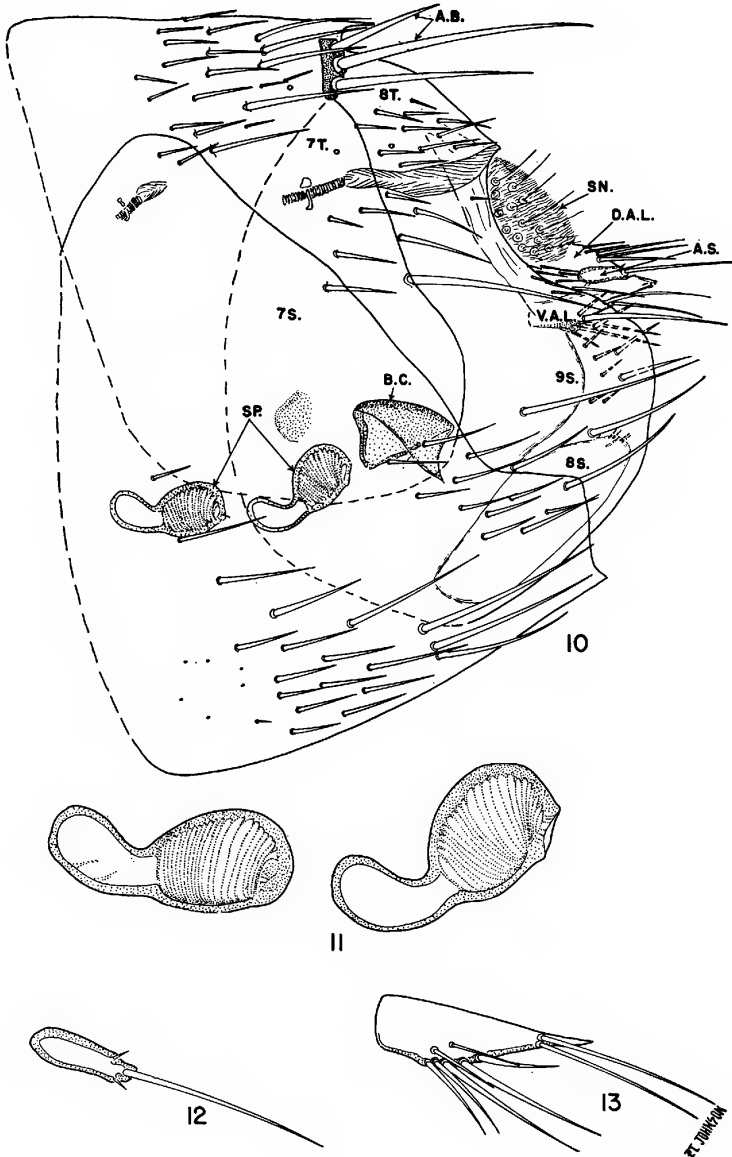


FIG. 5. *Atyphloceras multidentatus* (C. Fox, 1909). Immovable process and digitoid of clasper.

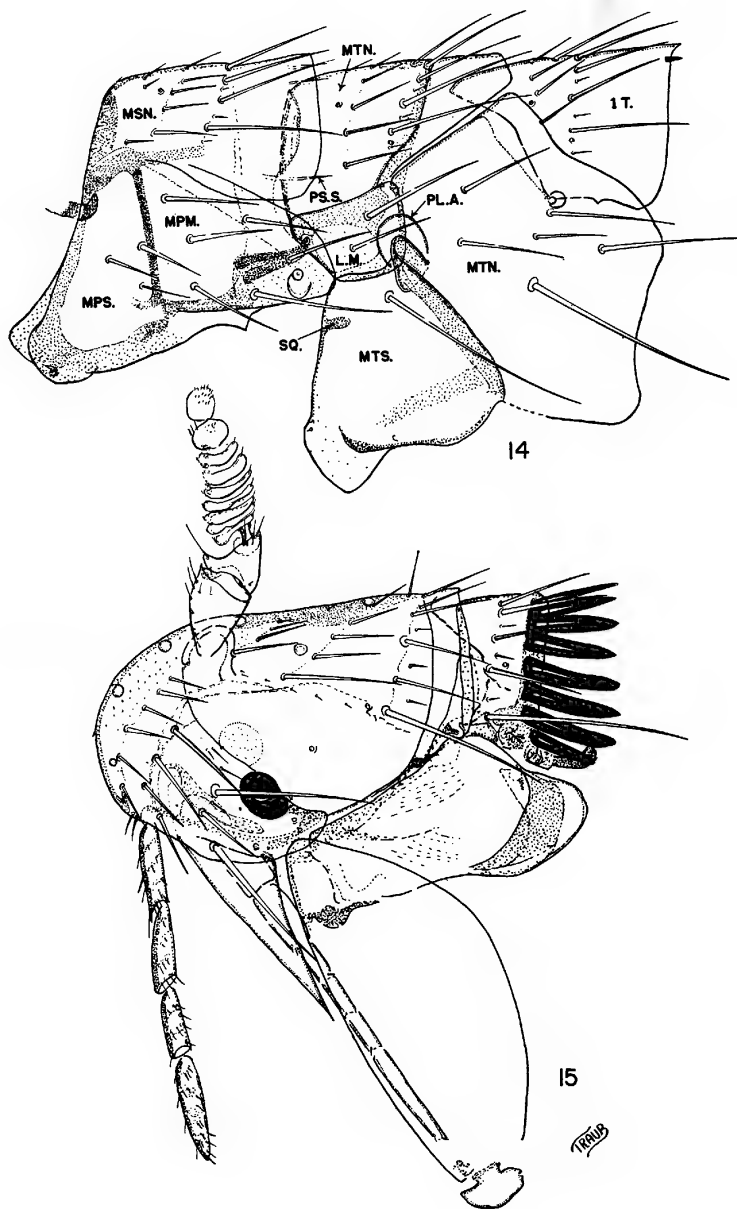
FIGS. 6, 7. *Atyphloceras tancitari*, new species. 6. Distal arm of ninth sternum, male. 7. Immovable process and digitoid of clasper.

FIG. 8. *Atyphloceras multidentatus* (C. Fox, 1909). Eighth sternum, male.

FIG. 9. *Atyphloceras echis* Jordan and Rothschild, 1915. Distal arm of ninth sternum, male.

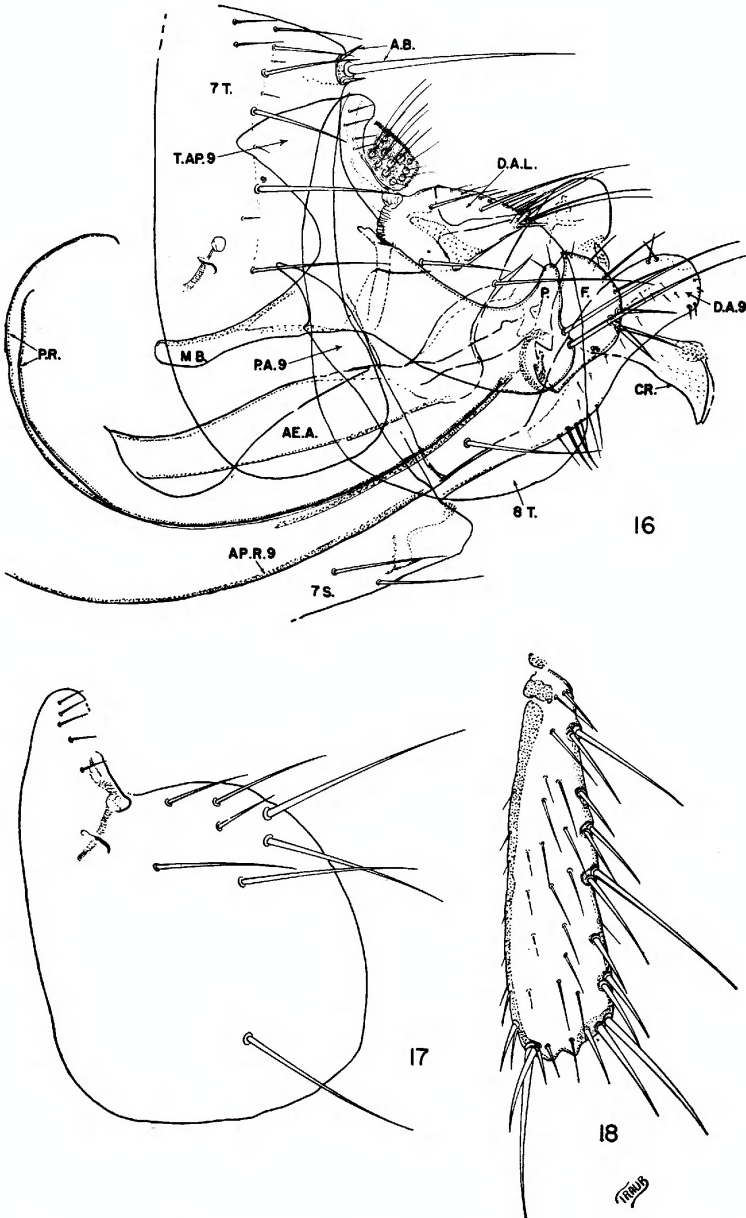


FIGS. 10-13. *Atyphloceras tancitari*, new species. 10. Modified abdominal segments, female. 11. Spermathecae. 12. Anal stylet. 13. Ventral anal lobe, female.



FIGS. 14, 15. *Jellisonia bonia*, new species. 14. Thorax, male. 15. Head, male.





FIGS. 16-18. *Jellisonia bonia*, new species. 16. Modified abdominal segments, male. 17. Eighth tergum, male. 18. Hind tibia, male.

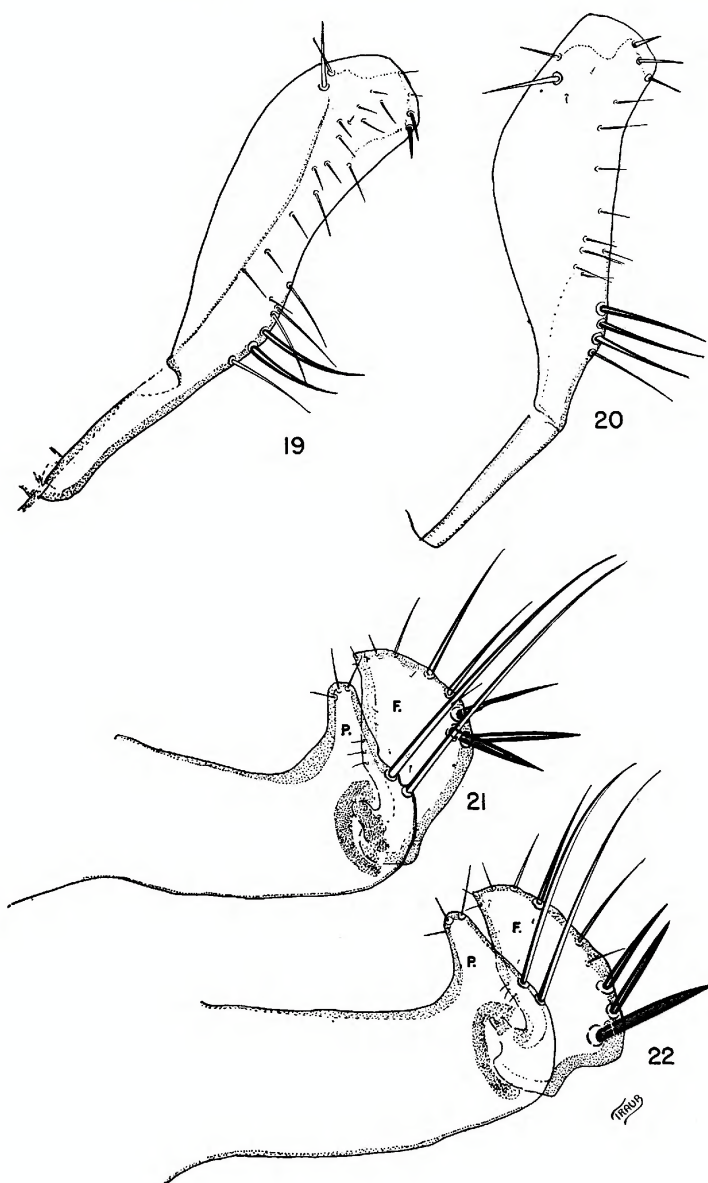


FIG. 19. *Jellisonia bonia*, new species. Distal arm of ninth sternum, male.

FIG. 20. *Jellisonia wisemani* Eads, 1951. Distal arm of ninth sternum, male.

FIG. 21. *Jellisonia bonia*, new species. Immovable process and digitoid of clasper.

FIG. 22. *Jellisonia wisemani* Eads, 1951. Immovable process and digitoid of clasper.

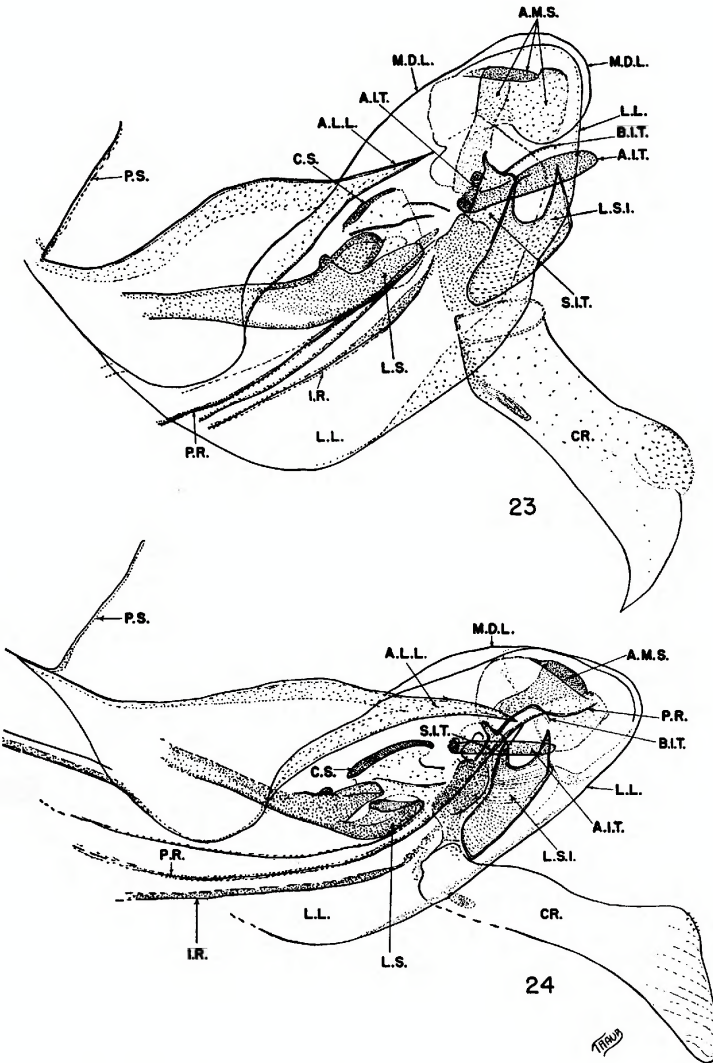


FIG. 23. *Jellisonia bonia*, new species. Aedeagus.  
 FIG. 24. *Jellisonia wisemani* Eads, 1951. Aedeagus.

